Three Ways to Cut Radiological Cleanup Costs, Conducted at Former NAS Alameda, California

Presented By

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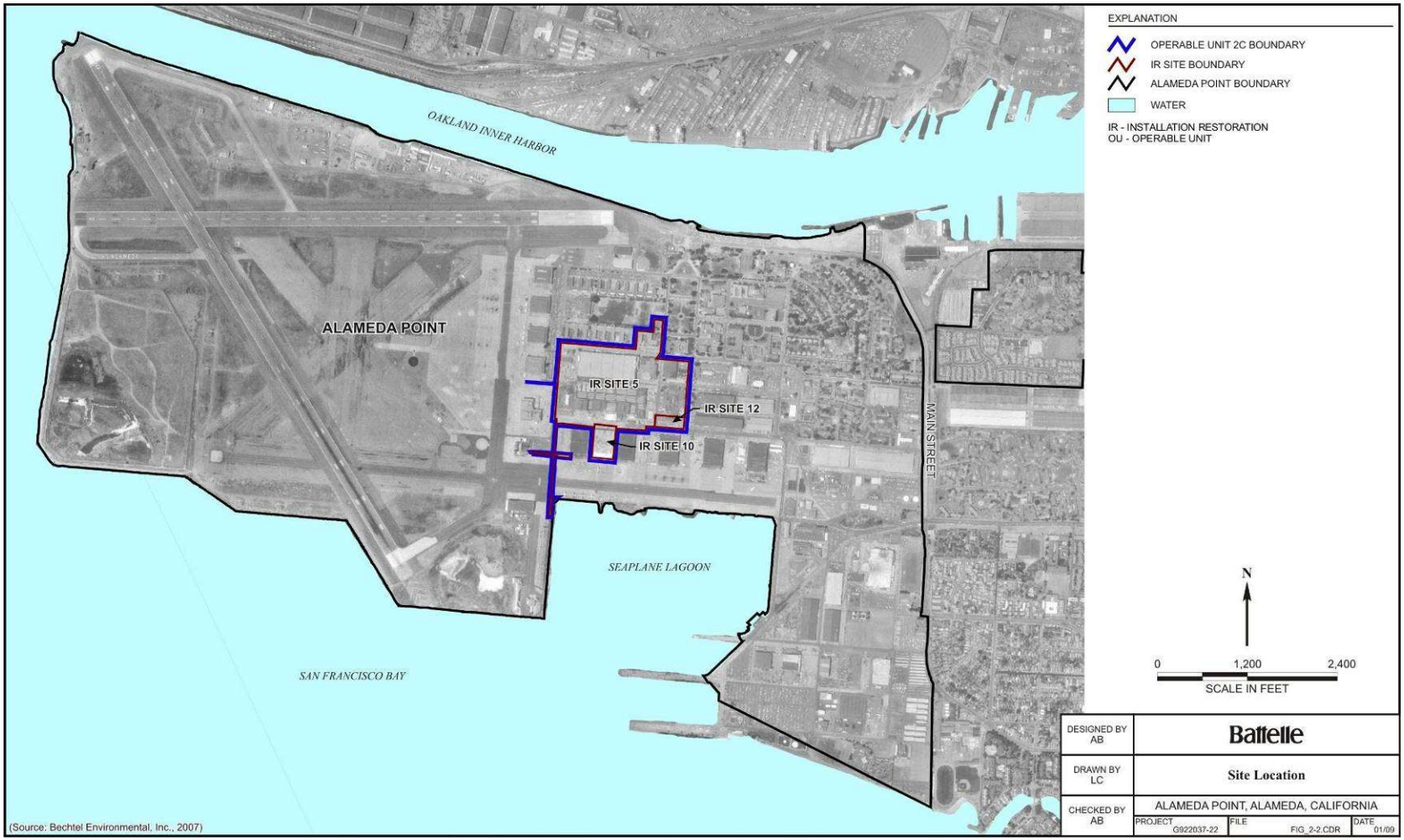
Objective

Describe three ways to cut radiological cleanup costs implemented at Alameda's Operable Unit [OU] 2C, including for:

- drain lines assessment/remediation
- buildings assessment/remediation
- integration of radiological and non-radiological assessments

Operable Unit 2C Location

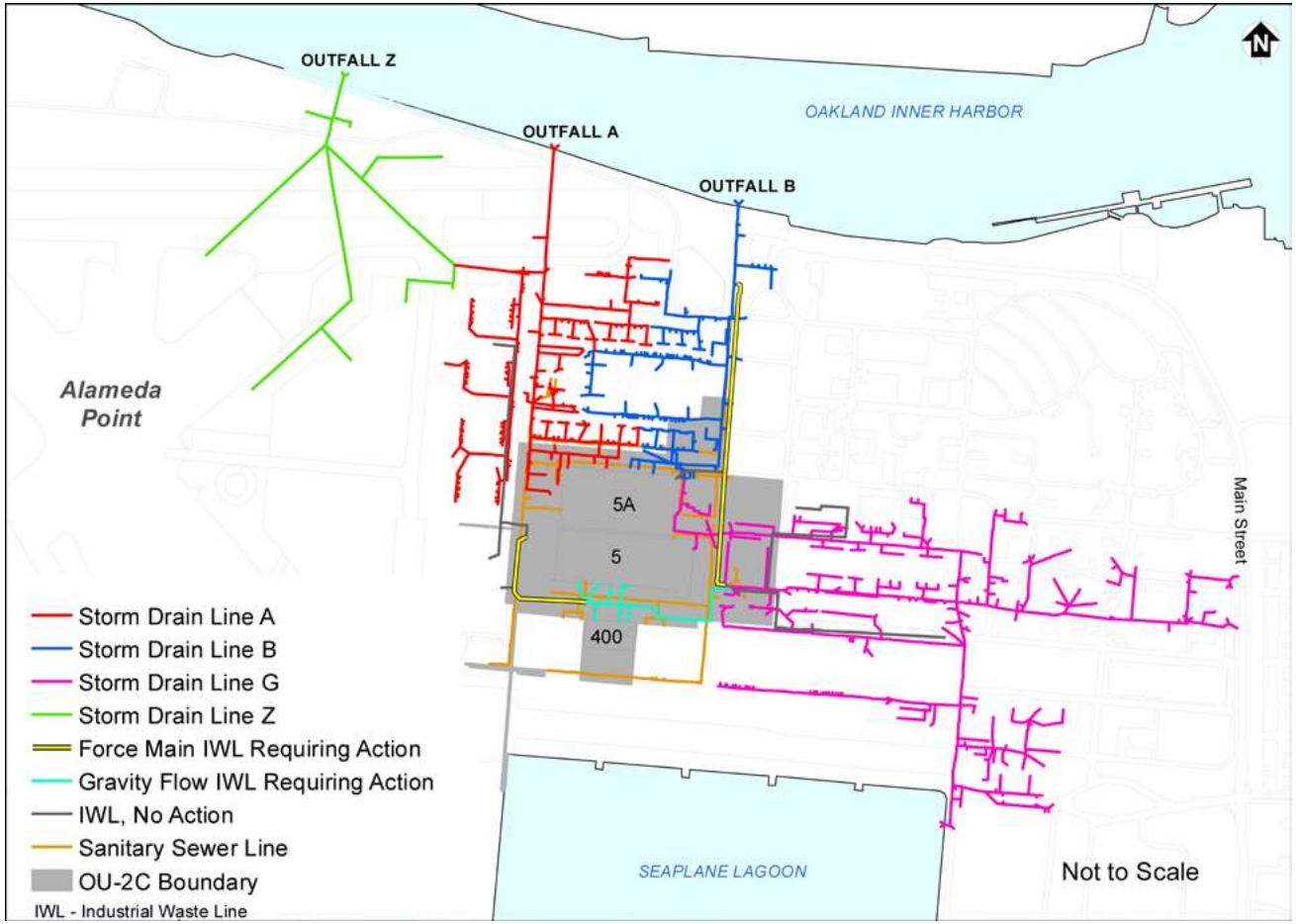


Operable Unit 2C Sites

OU-2C is approximately 53 acres in size and consists of Installation Restoration (IR) Sites 5, 10, and 12. IR Site 5, the largest site, is ~47 acres. Most of OU-2C is covered by buildings, and areas not covered by buildings are largely paved.

- IR Site 5 (Bldg. 5) is the former Naval Air Rework Facility.
- IR Site 10 (Bldg. 400) is the former Missile Rework Facility.
- IR Site 12 is the former naval air station (NAS) Power Station. No remedial action was necessary for IR Site 12.

Operable Unit 2C Features



History of Contamination

- Maintenance activities for aircraft within Buildings 5 and 400 resulted in contamination of soil and drain lines beneath and outside the buildings, shallow groundwater, and the building itself.
- Radium (Ra)-226 paint was used on compasses and plane and ship instrument faces and was discharged into drain lines/industrial waste line.
- Contaminants from the maintenance operations also included metals in soil and volatile organic compounds (VOCs) in shallow groundwater.
- No action for cesium-137 (up to 1.68 pCi/g in lines); evaluated as potential contaminant in Feasibility Study

Contaminants by Area

- Beneath Building 5: soil – metals; drain lines - Ra-226; groundwater – VOCs; contaminant areas overlap
- Beneath Building 400: drain lines - Ra-226
- Outside Buildings 5 and 400, areas include:
  - Minimal areas of contaminated soil and groundwater
  - Storm drain and industrial waste lines - Ra-226
  - Soil, groundwater, and drain/industrial waste line areas do not overlap
  - Radiological anomaly area in work area adjacent to Seaplane Lagoon

Radiological Anomaly Area - Radium Paint Waste

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RADIAN CORPORATION

FYI

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To Lino FRAGOSO	From G. KIKUGAWA
Co. RASO	Co. EFA-WEST
Dept.	Phone # (415)244-2549
Fax # (804)887-3235	Fax # (415)244-2654

22 January 1996

Alla Lyubovny
Engineering Field Activity West
900 Commodore Drive
San Bruno, CA 94066-5006

Subject: **Radiological Concern at Alameda NAS**

Dear Alla:

In accordance with your communication with Richard Mattison of Kinnetic Labs regarding potential radiological concerns at NAS Alameda, Kinnetic has performed a cursory radiological survey in selected manholes and outfalls at Alameda. We have attached the results of Kinnetic's investigation for your review.

Several results exceeded background levels. On the basis of these results, both Radian and Kinnetic feel that it is appropriate to halt all field activities at NAS Alameda until a further assessment of occupational hazards can be completed. Reporting tasks will continue as scheduled. Prior to resuming field activities, we require guidance from the Navy and recommend a more complete radiological assessment. Please contact Phil Tang at 510-932-7120 to further discuss this matter.

Sincerely,

Jeff Herrin
Project Director

c: Stephanie Szymanski, Environmental Protection Specialist, NAS Alameda
Barbara Wilson, Contract Specialist, EFA WEST
Richard Mattison, Kinnetic Laboratories
Phil Tang, Program Manager, Radian Corporation
Project File

Former NAS Alameda

Discovery of radium paint waste
Riprap at Seaplane Lagoon
Photo: NAVSEA RASO Archives

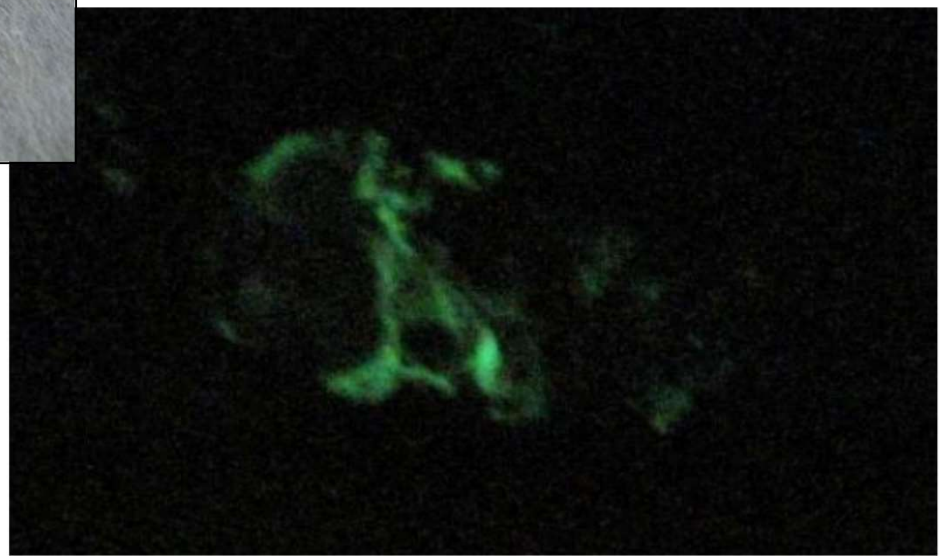
Radium Paint Waste

Former NAS Alameda

Shoreline of Seaplane Lagoon

Fragment of radium paint
Photo: NAVSEA RASO Archives

Dose rate reading: 70,000 µrem/hr on contact



Fragment of radium paint in dark
Photo: NAVSEA RASO Archives

Drain Line Approach at Alameda

- Conducted Hydrojetting of storm drain Lines A, B, and G (estimated 13,628 feet of line) followed by video camera with detector (and sampling outside lines if known impacted lines); no further action documented in December 2016 Record of Decision
- More contaminated line (Line F) that contained in excess of 1,000 pCi/g of Ra-226 in sediment was removed and replaced.
- Industrial waste line remedy is institutional controls (ICs), with minimal removal of sections to more easily allow redevelopment infrastructure to cross the line.

Hydrojetting Drain Lines

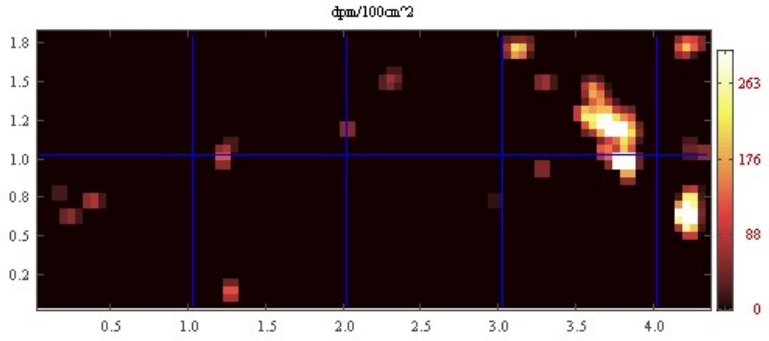
Building 5 Remediation

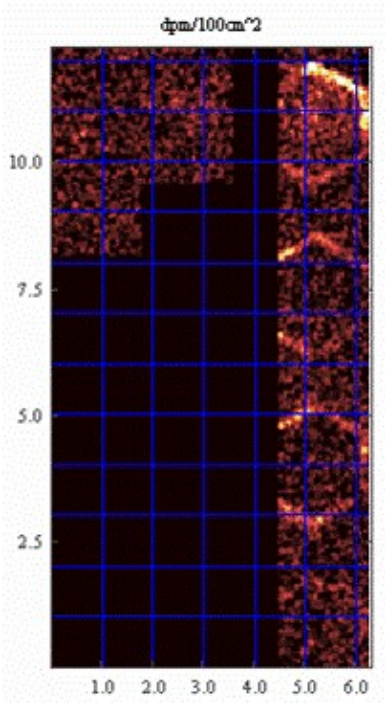
Building 5 is an approximately 1 million square foot building with no power. Work Plan specified 12 mrem/yr Federal dose standard. The surface contamination monitor (SCM; gas proportional detector for alpha and beta particles) was able to efficiently survey the first floor and identify contamination quickly:

- a 180 cm detector will cover an area 6 times faster than a 30 cm detector (all other parameters being equal)
- added benefits come from the equipment's sensitivity and ability to process data and provide color graphic images
- State of California regulators praised SCM use and immediate identification of contamination.

SCM Graphics

SCM Color Graphic Images of Radiological Contamination:
Left: Building 5 Ra-226 paint room contamination;
Right: Another project showing contamination beneath pads (SCM image and photo)





Building 5 Remediation

The Building 5 radiological remediation included use of a recently developed SCM model with:

- electronics package replaced with small computer chips
- computers with faster, more powerful systems (e.g. SurfacePro)
- battery power instead of AC and
- a weight less than one-third the weight of the older model SCM.

This results in significantly greater ease of use in the field; it was very efficient in this 2-story building with no electricity.

Building 5 Remediation

SCM Surveying Hangar Floor (left); SCM ~30 feet from floor, surveying I-beams and ceiling (right)

Integration of Radiological and CERCLA

Benefits to integrating radiological cleanup with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) cleanup:

- Allows cleanup in an already established and familiar framework; follows NAVFAC and RASO policy
- Existing legal document (i.e. Federal Facility Agreement)
- Cost effective, i.e. at OU-2C ICs address soils contaminated with metals as well as drain lines contaminated with Ra-226 (a cost effective remedy)

Cost Avoidance at Alameda

These approaches resulted in cost avoidance for OU-2C at Alameda as follows:

- Hydrojetting approach vs. removal and replacement of 13,628 linear feet of storm drain lines A, B, and G: ~$38M
- Using SCM vs. standard building survey equipment: ~$13M

Knowledge Check

- True/False: Successful remediation of radiologically impacted drain lines can be achieved without removal of the lines.
- True/False: All available methodologies for radiologically surveying buildings have similar costs and system outputs.
- True/False: There often are cost advantages to integrating radiological and non-radiological remedies at a site.

Summary

- The Hydrojetting (with verification) approach results in significant savings compared to removal and replacement of drain lines.
- Use of the SCM results in significant cost savings and regulatory agencies in California like use of the SCM vs. other methods for surveying buildings.
- Integrating radiological investigation and cleanup work with non-radiological/CERCLA work can result in more cost-effective remedies at the site.

Contacts and Questions

Points of Contact
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Questions ?